

CLAIM LISTING

1. (Original) A method, comprising:

performing vapor deposition with an organometallic vapor including copper to form a number of nanostructures on a substrate, the nanostructures each being freestanding during formation and composed of a material including copper; and wherein said performing provides the nanostructures each with a first dimension of 500 nanometers or less and a second dimension extending to a respective free end of at least ten times the first dimension.

2. (Original) The method of claim 1, wherein the nanostructures are each monocrystalline.

3. (Original) The method of claim 1, wherein the nanostructures are each in the form of nanowires with the second dimension being at least 50 times greater than the first dimension, and the nanostructures essentially consist of copper.

4. (Original) The method of claim 1, wherein the organometallic vapor includes Cu(ethylacetacetate)L₂ with L being trialkyl phosphite.

5. (Original) The method of claim 1, which includes enclosing the substrate and the vapor in a chamber and generating the vapor by evaporating a copper-containing precursor.

6. (Currently Amended) The method of claim 5, which includes heating the substrate to no more than about 400 degrees Celsius during said formingperforming.

7. (Original) The method of claim 5, which includes providing oxygen during the vapor deposition so that the material includes an oxide of copper.

8. (Original) The method of claim 5, wherein the vapor deposition is of a chemical vapor deposition type.

9. (Original) A method, comprising:

depositing a number of monocrystalline nanowires on a substrate from an organometallic substance, the nanowires each being freestanding during deposition and composed of a material including a metal; and

providing the nanowires with a first dimension of 500 nanometers or less after the deposition is completed.

10. (Original) The method of claim 9, which includes incorporating one or more of the nanowires into at least one of an integrated circuit device, a device to process signals having a frequency of 100 GHz or more, a display device, and a sensing device.

11. (Original) The method of claim 9, wherein the metal is copper and the material essentially consists of copper.

12. (Original) The method of claim 9, wherein the organometallic substance includes Cu(ethylacetatoacetate)L₂ with L being triakyl phosphite.

13. (Original) The method of claim 9, wherein said depositing includes performing a chemical vapor deposition with the organometallic substance and heating the substrate during said performing to a temperature of no more than about 400 degrees Celsius.

14. (Original) The method of claim 9, wherein the first dimension of each of the nanowires is 50 nanometers or less.

15. (Original) A method, comprising:

noncatalytically forming a nanowire on a substrate by performing vapor deposition with an organometallic substance;

growing the nanowire during said forming in a direction away from the substrate, the nanowire being freestanding during said growing; and

wherein the nanowire has a first dimension of 500 nanometers or less and a second dimension extending from the substrate to a free end of the nanowire at least 10 times greater than the first dimension.

16. (Original) The method of claim 15, wherein the nanowire is one of a plurality of nanowires made on the substrate during said forming and each of the nanowires has a diameter of 50 nanometers or less.

17. (Original) The method of claim 15, wherein the nanowire is monocrystalline.

18. (Original) The method of claim 15, wherein the nanowire essentially consists of copper or an oxide of copper.

19. (Original) The method of claim 15, wherein the organometallic substance includes $\text{Cu}(\text{ethylacetoacetate})\text{L}_2$ with L being trialkyl phosphite.

20. (Original) The method of claim 15, wherein the vapor deposition is of a chemical vapor deposition type and said forming includes enclosing the substrate in a chamber and heating the substrate to a temperature of 400 degrees Celsius or less during the vapor deposition.

21. (Original) A method, comprising:

growing a number of monocrystalline nanowires on a substrate from an organometallic substance including copper, the nanowires each being composed of a material including copper; and

providing the nanowires with a first dimension of 500 nanometers or less after said growing is completed.

22. (Original) The method of claim 21, which includes incorporating one or more of the nanowires into at least one of an integrated circuit device, a device to process signals with a frequency of 100 GHz or more, a display device, and a sensing device.

23. (Original) The method of claim 21, wherein the organometallic substance includes

$\text{Cu}(\text{R}^1\text{OCOCR}^2\text{COR}^3)\text{L}_x$, wherein:

R^1 is a $\text{C}_1\text{-C}_9$ hydrocarbyl group;

R^2 is H, fluorine F, or a $\text{C}_1\text{-C}_9$ hydrocarbyl group;

R^3 is a $\text{C}_1\text{-C}_9$ hydrocarbyl group or an alkylsilane group of the formula $\{-\text{Si}(\text{R}^4)(\text{R}^5)(\text{R}^6)\}$, in which R^4 , R^5 , and R^6 are each H, F, a $\text{C}_1\text{-C}_9$ hydrocarbyl group, or a $\text{C}_1\text{-C}_9$ alkoxy group of the formula $\{-\text{OR}\}$, in which R is a $\text{C}_1\text{-C}_9$ hydrocarbyl group bonded to silicon (Si);

x is 1, 2, or 3; and

L is a ligand of the formula $\{\text{P}(\text{R}^7)(\text{R}^8)(\text{R}^9)\}$, in which R^7 , R^8 , and R^9 are each a hydroxy group, a $\text{C}_1\text{-C}_9$ hydrocarbyl group, or an alkoxy group of the formula $\{-\text{OR}\}$, in which R is a $\text{C}_1\text{-C}_9$ hydrocarbyl group.

24. (Original) The method of claim 23, which includes performing chemical vapor deposition with the substrate at a temperature of 400 degrees Celsius or less and a pressure of 1.0 torr or less during said growing.

25. (Original) The method of claim 24, wherein said performing includes decomposing a vapor to release at least a portion of the copper included in the copper of the nanowires.

26. (Original) The method of claim 21, wherein the first dimension of each of the nanowires is 50 nanometers or less and the material essentially consists of copper or an oxide of copper.

27. (Original) The method of claim 21, which includes incorporating the nanowires into at least one of an integrated circuit device, a device to process signals having a frequency of 100 GHz or more, a display device, and a sensing device.

Claims 28-40 (Canceled).